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Ethnoprimatology and the Anthropology of the Human-Primate Interface*

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Keywords

ethnoprimatology, primate studies, Anthropocene, niche construction, anthropogenic ecology

Abstract

Humans are literal and figurative kin to other primates, with whom many of us coexist in diverse social, ecological, symbolic, conflictual, and even hopeful contexts. Anthropogenic action is changing global and local ecologies as fast as, or faster than, we can study them. Ethnoprimatology, the combining of primatological and anthropological practice and the viewing of humans and other primates as living in integrated and shared ecological and social spaces, is becoming an increasingly popular approach to primate studies in the twenty-first century. This approach plays a core linking role between anthropology and primate studies and may enable us to more effectively assess, and better understand, the complex ecologies and potential for sustainability in human–other primate communities. Here I review the basic theoretical underpinnings, historical contexts, and a selection of current research outcomes for the ethnoprimatological endeavor and indicate what this approach can tell us about human–other primate relations in the Anthropocene.

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INTRODUCTION

Anthropocene: the current geological epoch wherein anthropogenic agency is one of the prominent forces affecting global landscapes and climates

Ethnoprimatology: theoretically and methodologically interdisciplinary study of the multifarious interactions and interfaces between humans and other primates

As humans, we are anthropoid primates; we belong to the taxonomic group (Primates) that includes apes, humans, monkeys, and prosimians. We have biological and metaphorical kinship with other primates and frequently coexist with them in diverse social, ecological, and symbolic systems. The indigenous geographic spread of this coexistence is broader than many scholars think, with human–other primate overlaps in much of sub-Saharan Africa, parts of Northern Africa and the circum-Mediterranean region, South and Southeast Asia, Japan and Southern China, and Central and South America. The past few centuries have seen contact extend to areas well outside many primates' native ranges owing to capture and breeding for zoos and research facilities and the widespread use of primates in entertainment. The temporal depth for the human–other primate interface is also quite deep. Humans and other primates have coexisted and interacted throughout most of Africa; East, South, and Southeast Asia; the Mediterranean region; and Central and South America for the entire time that our own genus (*Homo*) has resided in these locations.

Today, in the Anthropocene, humans are changing global and local ecologies as fast as, or faster than, we can study them (e.g., Economist 2011, Palmer et al. 2004, Rose 2009), so recognizing our roles as animals and with other animals can help us gain a better grasp on inquiries into important anthropological topics. Employing a revised primatological and anthropological practice, one that places humans and other primates in integrated and shared ecological and social spaces, has become a necessary approach. This approach is epitomized by the emerging arena of ethnoprimatology. Here the "ethno" prefix marks the inclusion of anthropogenic aspects, including the social, economic, and political histories and contexts as core components of inquiry into the lives of other primates and their interfaces with humans (Fuentes 2006c; Fuentes & Hockings 2010; Fuentes & Wolfe 2002; Riley 2006, 2007; Sponsel 1997). This is importantly different from the use of the "ethno" prefix in "ethnobotany" or "ethnomathematics," in which "ethno" marks a cultural distinction in the specific way of knowing under study from Western forms of the practice. Ethnoprimatological approaches affirm the role of humans as primates and of other primates as coparticipants in shaping social and ecological space, recognizing mutual roles in both ecological and cultural interconnections. This approach creates a fruitful venue for integrating subareas of anthropological practice and assessing the mutual ecologies, evolutionary histories, and social lives at the interface of humans and other primates (Fuentes & Wolfe 2002, Paterson & Wallis 2005, Riley et al. 2011).

Ethnoprimatology moves away from the view that the human–other primate interface is viewed best under the dominant rubric of conflict and competition with hunting/food and pets/pestilence as the core foci structuring investigations. It also rejects the notions that there are ecosystems on the planet in which humans have no impact and that studying primates in minimally impacted "natural" settings gives us higher-quality, and more valuable, knowledge than studying those primates who live alongside us. Ethnoprimatology rejects the idea that humans are separate from natural ecosystems and mandates that anthropological and multiple stakeholder approaches be included in behavioral ecological and conservation research on other primates (Fuentes & Hockings 2010, Lee 2010, Loudon et al. 2006b, Riley 2010).

HISTORY, INFLUENCES, AND THE EMERGENCE OF ETHNOPRIMATOLOGY

Ethnoprimatology is emerging as a hybrid field of study and is influenced via at least four lineages: field primatology and primate conservation, animal studies in sociocultural anthropology, anthrozoology and aspects of the animal welfare movement's critique and engagement with primatology.

Field primatology has two primary roots: the natural historical and psychological

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primatology of North America and Europe, beginning in the early to mid twentieth century, and the integrated primatology of Japan, starting with Kinji Imanishi and his students at approximately the same time (Asquith 1995, 2000; Rodman 1999; Sussman 2011). Early field work by the psychologist Raymond Carpenter combined observations of primate natural histories with the capture, killing, and preservation of the focal specimens in museum collections. This work was among the first formal ventures into studying the naturalistic behavior of nonhuman primates and initiated field primatology (Rodman 1999, Sussman 2011). The primary locations for this early phase were tropical forests in Central America and Southeast Asia, and the work focused exclusively on the role of "wild" primates presumed to exist largely outside of human influence. However, in the majority of these locales there were indigenous and other peoples who hunted, and interacted in other manners, with the alloprimates in their midst. Unfortunately, the role of these sympatric humans as components of the local ecology was largely ignored by the investigators. In Japan, the orientation in primatology was that of ecological and ethnographic observation, with a focus on the social relationships among the members of primate groups and their relationships with their local environments. This approach initially concentrated on the macaques living in Japan, who were alloprimates to the Japanese people and, in many areas of overlap, already played roles in humans' mythological and practical lives (Asquith 1995, 2000). However, here as well the interface with humans was not included as a central component in much of the published analyses.

By the 1950s, American Biological Anthropologist Sherwood Washburn called for a "new physical anthropology," which specifically involved the behavioral and ecological study of other primates as a core in the investigation of human evolution and behavior (Rodman 1999, Sussman 2011, Washburn 1951). This method combined with the emerging European field of ethology (the study of animal behavior) and the ongoing Japanese approach to documenting primate societies, developed into field primatology in its modern form, where the dominant focus is the behavioral ecology of free-ranging primates. This history and context for modern field primatology lead to both the comparative approach and the goal of observing primates in naturalistic settings as the gold standards. This approach inadvertently set up a dichotomy between naturalistic locations, those with little perceived human impact, and disturbed settings, those undeniably impacted by human agency, which resulted in the exclusion of most human-alloprimate interface zones from serious study in primatology. Or, if primates in these areas were studied, the role of the human agents was minimized. This pattern began to change in the last third of the twentieth century as human interfaces became so prominent that they were impossible to ignore and many primate populations were undergoing severe reduction in their habitats as a result of human activity. Field primatologists are now almost always confronted with conservation issues and significant human presence in their field sites. There is an increased role of conservation in primate studies and the growing recognition that human impact matters even in ostensibly natural sites (Fuentes & Wolfe 2002, Strier 2011, Wallis & Lee 1999; see also Wrangham 1974).

Alloprimate: nonhuman primate species that overlap spatially and ecologically with humans

Although social scientists and historians occasionally focused on the relationships between humans and other primates (Corby & Theunissen 1995, Janson 1952), mainstream anthropology largely ignored this interface. Analysis of other animals' roles in human symbol and myth was well established in social anthropology from the 1950s onward (Ingold 1988, Leach 1964, Levi-Strauss 1963, Shanklin 1985); however, it was not until the last decades of the twentieth century that the importance of actual human–other animal relationships began to take a more central, structural role in sociocultural anthropology's gaze (Cassidy 2012, Cassidy & Mullin 2007, Mullin 1999, Shanklin 1985). Anthropologists became more aware of the fluidity and entanglements between humans

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and other animals in their midst (Mullin 1999, Shanklin 1985). In some cases, sociocultural anthropologists included other primates as central facets of the ethnographic realities they observed (e.g., Ohnuki-Tierney 1987, 1995). Recently this trend of seeing alloprimates as nested in human lives and vice versa has become a viable thread in sociocultural anthropology, and its practitioners have become central players contributing methodological and theoretical infrastructure to ethnoprimatology (Cormier 2003; Knight 2006; Lizralade 2002; Shepard 2002; Sponsel 1997; Sponsel et al. 2002). They have deployed and expanded ethnographic tool kits to move beyond the boundary of the human and give agency, in symbolic, social, and ecological senses, to the human-alloprimate interface. This inclusion of the nonhuman other as central in the examination of being human has also emerged as the core narrative in the embryonic field of multispecies ethnography. This approach dictates that anthropological knowledge, produced through a multispecies lens, can be developed as a mode of "naturecultural" criticism and can contribute to new kinds of biological, and other, anthropologies (Haraway 2008, Kirksey & Helmreich 2010).

The recent transdisciplinary fields of anthrozoology and human-animal studies also make a contribution to the context in which ethnoprimatology is coming of age. Anthrozoology defines itself as the study of relationships between humans and other animals and consists of research from a diverse array of fields across the social and biological sciences, with heavy representation by veterinarians, public health researchers, psychologists, and psychiatrists. Although a few anthropologists and primatologists have published in *Anthrozoos*, the flagship journal of the International Society for Anthrozoology (ISAZ), human–other primate relationships are surprisingly rare in anthrozoogical discourse. Given the field's commitment to cover the full range of human-animal relations, from the arts and humanities to behavioral, biological, social, and health sciences, work in ethnoprimatology will likely become increasingly represented in the journal and thematically related conferences. Human-animal studies also focuses on the complex and multidimensional relationships between humans and other animals, but it draws mainly from a range of social scientific and humanities disciplines and involves a larger connection to the animal welfare movement. Both of these areas of investigation tend to be focused on pet animals and human-animal relationships in North America and Europe; thus, alloprimates play a very minor role in their publication profiles. However, the increased presence of these kinds of human-animal studies in North America and European University curricula has contributed to the growing awareness that humans interface with other animals in significant and complex ways and that these contexts are worthy of intellectual engagement.

Finally, the field of ethnoprimatology has been influenced by the primate rights and welfare movement. A number of animal rights/welfare theorists, along with some primatologists, have criticized many primatologists and anthropologists working with other primates for ignoring or downplaying animal rights, agency, and histories of oppression and exploitation in their research and theoretical treatment of primates (Cavalieri & Singer 1995, Haraway 1989, Noske 1993, Singer 1999). The most prominent and ongoing of these critiques is the Great Ape project and the drive for universal rights for apes (Cavalieri & Singer 1993). A number of primatologists are active supporters of this movement; however, to date, the primate welfare movement in general has seen little academic engagement between anthropologists and the world of captive primates in North America and Europe. In regard to field contexts, the biosynergy project in equatorial Africa (Rose 2002, 2011) is the main example wherein aspects of ethnoprimatology are melded with ape welfare approaches in attempts to bring primatological and anthropological studies to bear in bushmeat hunting scenarios. Most recently, Vitale & Pollo (2011) edited a special edition of the *American Journal of Primatology* centering on bonds between humans and the primates they study and

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arguing for recognition of mutual agency and empathic exchanges in primatologist–other primate relationships. Although not exclusively ethnoprimatological, the articles in the volume reflect the growing consensus in primate studies that the interface between humans and other primates influences research outcomes and that understanding relationships between researchers and their nonhuman study subjects can be an essential element in primatological practice (e.g., Asquith 2011, Malone et al. 2010).

The convergence of influences from these four areas created a fertile ground that influenced primatologists and sociocultural anthropologists conducting research in areas of dense human-alloprimate interfaces in the 1990s and early 2000s. The initial publications in an incipient ethnoprimatology were of human–other primate interactions and primate crop raiding and focused on the human behavioral impact on other primates or other primates' impact on human livelihoods.

In the early 1990s, the intensive interactions between humans and Barbary macaques (*Macaca sylvanus*) at tourist sites in Gibraltar inspired local researchers to conduct studies of human-macaque interactions, looking at variables such as human density and feeding of the macaques and aggression between both species (Fa 1992, O'Leary & Fa 1993). A similar tourist-monkey interaction data set followed shortly thereafter on the macaques of Bali, published by Wheatley & Harya Putra (1994). Brief reports on tourist-macaque interactions in Asia were also published by Wolfe (1991) and Zhao (1991), and an overview of highly sympatric monkey populations at Buddhist temples in Thailand was also published at this time (Aggimarangsee 1992). These were the first of the primate–tourist-site interaction studies that have become relatively common nearly 20 years later, and they offered a portent of the role that such temple and tourist-site populations would play in future ethnoprimatological projects.

During this same period, and increasing thereafter, there was another suite of publications addressing the roles of monkeys in crop raiding and giving at least a nod to the local human culture and perceptions as influencing the interface and interactions between species (e.g., Else 1991, Naughton-Treves 1998, Strum 1994). Hill (2000) set the stage for later, more ethnoprimatological, crop conflict studies by including perspectives of local farmers and combining local human economic and cultural behavior variability alongside baboon behavior in assessments of the crop-raiding interface between humans and alloprimates.

In the late 1990s and early 2000s, the first batch of fully ethnoprimatological publications appeared. Core among these was a chapter by the ecological anthropologist Sponsel (1997), who coined the term ethnoprimatology and set the basal intellectual stage for future work at the human-alloprimate interface. Primatologist Wheatley's (1999) book on the lives of temple monkeys at Padangtegal/Ubud, in Bali, Indonesia, and their roles in the local Balinese Hindu context, was the first to integrate specific methodologies from primatology and ethnography and to include cultural anthropological analyses alongside primate behavior and ecology. Equally impactful was sociocultural anthropologist Cormier's (2002, 2003) work with the Guaja and their monkey kin, where she elaborates ethnographically and primatologically on the complex and intertwined lives and ecologies of humans and alloprimates in one ethnic group from Amazonia. Coming fast on the heels of the early publications, the edited volume *Primates Face to Face: The Conservation Implications of Human-Nonhuman Primate Interconnections* (Fuentes & Wolfe 2002) facilitated the establishment of ethnoprimatology as connected intrinsically to the broader anthropological and primatological discourse. Fuentes & Wolfe proposed that because of the biological, phylogenetic, and behavioral overlaps between humans and nonhuman primates, relationships between the two groups have a special significance. This edited volume has 18 chapters by sociocultural anthropologists, biological anthropologists, primatologists, psychologists, and conservationists, with topics ranging from theoretical and ethical approaches

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THE ETHNOPRIMATOLOGICAL MANIFESTO

1. Much of what we consider "normative" behaviors for primates may be stimulated by specific anthropogenic contexts.
2. The assumption that most primate populations have never been influenced by, or been forced to respond to, human activities in their recent or evolutionary histories is incorrect.
3. Physiological, phylogenetic, and behavioral affiliations between humans and the other primates result in the two groups' relationships having a special significance ecologically, behaviorally, and evolutionarily.

to studying primates to cultural views, conservation, and economic and ecological interfaces between humans and other primates with case studies from Africa, Asia, and the Americas. This text was followed by a substantial edited volume on human-alloprimate conflict and commensalism (Paterson & Wallis 2005), which contained 21 chapters, mostly ethnoprimatological in nature, from an international authorship. By this point, ethnoprimatology had become a valid enterprise.

In the mid-2000s, the focus on anthropogenic landscapes, shared ecologies, and the contexts of being human and alloprimate as both a theoretical and a methodological goal was becoming broadly known in primate studies, with ethnoprimatological approaches proposed as the primary means to achieve that goal (Fuentes 2006c, Riley 2007). Additionally, there was a surging sentiment that anthropology must finally move past the remnants of the "science wars" and intersubdisciplinary rifts, and key researchers noted that ethnoprimatological projects provide a particularly robust arena for the (re)integration of sociocultural and biological perspectives in anthropology (Fuentes 2006a, Riley 2006). By 2007, ethnoprimatology was included as a chapter in the most substantive overview of primate studies to date (Wolfe & Fuentes 2007 in Campbell et al. 2007; see also Riley et al. 2011). Its integration into mainstream approaches in primate studies was further solidified with the appearance of special issues devoted to ethnoprimatological studies and commentary in the online journal *Ecological and Environmental Anthropology* and the high-impact *American Journal of Primatology* (Fuentes 2006c, Fuentes & Hockings 2010). Today, ethnoprimatology is a common constituent of much primatological and anthropological practice.

Niche construction: dynamic interaction and mutability between organisms and their environments creates an ecological inheritance and affects patterns of natural selection

ETHNOPRIMATOLOGY AND THE NEW WAVE OF HUMAN-ALLOPRIMATE INTERFACE STUDIES

This young field of study, with its input from a diversity of disciplines and practitioners, is organized under a rubric of basal principles: the ethnoprimatological manifesto (see sidebar). The three core points in this manifesto are concise declarations of the reality that humans and other primates have participated in a myriad of interfaces since before the advent of the species *Homo sapiens*. Rapid and monumental niche construction by humans in the past few millennia has radically altered ecosystems ushering in the Anthropocene, meaning that basic primate ecology must include the interface with humans and anthropogenic ecologies to study primates effectively, and thus, the undertaking must be multidisciplinary [or at least involve diverse methodologies (e.g., Jones-Engel et al. 2011b, Riley & Ellwanger 2012). Synergistic methodologies involving aspects of field primatology, behavioral ecology, human ecology, ethnography, ethnology, folklore, history, geography (including landscape analyses), economics, surveys, and interviews are all components of the ethnoprimatological tool kit. This approach also requires teamwork and, usually, research teams composed of more than one discipline or one perspective. The ethnoprimatological manifesto advocates for collaborative approaches that see humans and other primates as partners, or at least coparticipants, in shared ecologies and evolutionary trajectories. Employing this approach creates a better chance for arriving at significant and comprehensive answers to questions about primate and

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human ecology, behavior, and sustainable coexistence in the twenty-first century (Lee 2010).

The best way to illustrate the content and approaches across ethnoprimatology is to review a number of recent and/or ongoing studies in this area. Core study sites for these projects include Bali and Sulawesi in Indonesia, the Beza Mahafaly Special Reserve in Madagascar, the Budongo forest in Uganda, the site of Bossou in the Republic of Guinea, and the Dzanga-Sangha Reserve in Central African Republic, among others. Additionally, there are a number of cross-site studies including those involving tourist-macaque interactions, human-alloprimate conflict and conservation, and human-alloprimate bidirectional pathogen transmission. The following is only a brief overview of selected examples of the rapidly growing ethnoprimatological enterprise and is by no means an extensive sample or a prioritized list.

Expanding on Wheatley's (1999) pioneering work in Bali, Indonesia, Fuentes and colleagues continued research at the temple site of Padangtegal/Ubud (Fuentes 2010, Fuentes et al. 2011, Fuentes & Gamerl 2005) and also expanded the project to the entire island of Bali (Engel et al. 2006; Fuentes et al. 2005; Lane et al. 2010, 2011; Loudon et al. 2006a; Schillaci et al. 2010). At Padangtegal, researchers focused on the behavioral ecology of temple macaques (*Macaca fascicularis*) with Balinese Hinduism and ritual practice, the daily interfaces between local humans and the macaques, and domestic and international tourists as key components of the ecosystem. They also examined human-macaque interactions along a range of behavioral, gender, and cultural contexts. Teams involving primatologists, biological anthropologists, sociocultural anthropologists, biologists, and economists participated in the data collection for more than eight years, integrating methodologies from their respective fields. Although the last data collection for the Padangtegal project took place in 2003, the researchers continued working with local temple and community representatives to develop management and conservation schemes still in place today. Recently a new behavioral ecology project, explicitly including a broad range of anthropogenic factors, has picked up where the original project left off (Brotcorne et al. 2011). The larger Bali-wide research included pathogen transmission studies; population genetics; and the relationships among anthropogenic landscapes, economic and political histories, and macaque distribution, behavior, and ecology.

The results of the project demonstrate that dynamic anthropogenic environments and a long history of human-macaque interactions on Bali shape the social and physiological lives and population structures (demographic and genetic) of the macaques and that the macaques play significant roles in the culture, and economy, of the Balinese. For example, human landscape modification via agriculture and religious practice is a key factor in explaining the patterns of genetic variation, group size, and overall body weight across macaque populations on Bali, and humans and macaques seem to have a long history of pathogen exchange and potential coevolution. Also, at many sites macaque ranging and daily activity profiles are connected to the patterns of tourist visits and Balinese Hindu ceremonies. Simultaneously, macaques play central roles in much Balinese mythology and dance, and Balinese living in and around monkey forests often gain significant financial benefits from monkey-focused tourism.

Over the past decade on the Indonesian island of Sulawesi three groups of researchers have been engaged in expanding basic ecological questions to include explorations of humans and Sulawesi macaque interconnections in ecological and cultural contexts (Jones-Engel et al. 2001, 2005a; Priston 2005; Riley 2006, 2007, 2010; Riley & Fuentes 2011; Riley & Priston 2010). Researchers looked at multiple species of Sulawesi macaques that interface with human populations, asking questions about pet keeping and pathogen transmission, primate ranging and human land use, impacts of human cultural patterns on perceptions of primates, primate conservation, crop-raiding from both human and macaque perspectives,

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and macaques in human mythos, in addition to standard behavioral ecological studies of the macaques. Their methodologies include direct observations, questionnaires, ethnographic interviews, ecological analyses, and physiological investigations. Results and ongoing studies suggest that Sulawesi differs from many other locales where macaques and humans overlap. Sulawesi has a unique suite of macaque species that differ behaviorally and ecologically from other Southeast Asian primates, and local ecologies and diversity in human land-use patterns, religious beliefs, and other cultural practices indicate that a mixture of ethnographic, economic, and behavioral approaches are going to be key to sustainable human-alloprimate relationships into the future.

Although long-term primate behavior and ecology research is ongoing at the Beza Mahafaly Special Reserve in Madagascar, ethnoprimatological work was undertaken there in the mid-2000s. A specific focus on human-lemur relationships used anthropological, ethological, and parasitological methodologies to investigate the interface between ring-tailed lemurs (*Lemur catta*), Verreaux's sifaka (*Propithecus verreauxi*), and humans (*Homo sapiens*) (Fish et al. 2007, Loudon et al. 2006b). The project found that human landscape-use patterns and coprophagy by the more terrestrial lemurs (of human, dog, and zebu feces) led to shared parasite ecologies. They also found cultural perceptions tied to origin myths that included taboos against lemur hunting and perceptions of ancestral forces that protected certain forests against deforestation. They found that paleontological and subfossil data suggest the current cultural perceptions, taboos that seem to benefit the lemurs, may be of relatively recent origin.

Around the Budongo forest in Uganda, in addition to studying the behavioral ecology of primates, researchers (Hill 2000, 2005; Hill & Webber 2010; McLennan & Hill 2010; Webber et al. 2007) examined crop raiding and interspecies encounters between humans and baboons (*Papio anubis*), guenons (*Cercopithecus mits*, *C. ascanius*, *C. aethiops*), colobus (*Colobus guereza)*, and chimpanzees (*Pan troglodytes*). They investigated actual patterns and contexts of the crop raiding, human perspectives on the primates and their relationships with them, and the potential impacts of increasing interspecies interactions. They contextualized the human-alloprimate interface within Banyoro (the local ethnic group) social ideologies, the current political and economic crisis in Uganda, and agricultural practices and related these to the perspectives humans hold about the alloprimates around them. They examined culturally perceived differences between primate species and the actual behavior of the primates in relation to conflict and coexistence with humans and melded this into the structuring and assessments of human-primate conflict mitigation programs.

The site of Bossou, in the Republic of Guinea, has been a focal point for long-term behavioral ecology studies of chimpanzees. However, recent ethnoprimatological investigations (Hockings 2009; Hockings et al. 2009, 2010) have focused on the chimpanzee use of anthropogenic ecologies, especially human crops, attacks by chimpanzees on humans, and the human responses and perceptions of these attacks. Integrating ecological and behavioral data sets for humans and chimpanzees alongside in-depth analyses of these aggressive interactions between the species enabled the investigators to develop a suite of recommendations for residents and researchers to ameliorate the potential for violent interspecies conflicts (Hockings & Humle 2009).

At the Dzanga-Sangha Reserve in Central African Republic, long-term investigations of the complexity of human-wildlife relationships demonstrate how studying a zone of interaction as a dynamic mutual ecology provides a nuanced understanding of the entangled relationships between humans and other animals, especially primates (Hardin & Remis 2006; Jost-Robinson et al. 2011; Jost-Robinson & Remis 2012; Remis 2000; Remis & Hardin 2007, 2009). Integrating primate behavior and ecology, conservation research, and ethnographic work on local human populations with

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the theoretical concepts of nature cultures and mutual ecologies (Fuentes 2010, Haraway 2008) results in an innovative and significant suite of findings. Their results demonstrate the relevance of shifting ethnic, economic, and technological changes in local humans' ecologies to alloprimate lives. They show that fluctuating perceptions, mythos, and behavior on the part of the humans has concrete effects on the behavior and ecology of the other primates in the areas of overlap. Population size, social behavior, and activity patterns (day/night activity) of multiple monkey species shifted or altered in response to changing human forest use activity and perceptions brought on by shifting economic, ethnic, and political realities. This ongoing project is one of the most successful at truly assimilating significant methodological and theoretical contributions from sociocultural anthropology, primatology, and human-animal studies and applying them both to local management and conservation issues and to larger intellectual debates.

In addition to these single-site projects, ethnoprimatology is also being practiced in multisited and multi–research team contexts. The examination of human-macaque interactions, especially in regard to tourists and macaques, has become one of the dominant topics. One species of macaque, *Macaca fascicularis*, is ubiquitously associated with humans, and its behavioral ecology and ethnoprimatology were recently the subject of an entire 13-chapter, 50-author, decidedly international edited volume (Gumert et al. 2011, Jones-Engel et al. 2011a). Work on the specifics of human-macaque (various species) interactions in Bali, Indonesia (Fuentes 2006b; Fuentes et al. 2007a,b; Fuentes & Gamerl 2005), Gibraltar and Morocco (Fa 1992; Fuentes 2006b,d; Fuentes et al. 2007a,b; Marechal et al. 2011; O'Leary & Fa 1993; Schurr et al. 2011; Unwin & Smith 2010), Mt. Emei and Mt. Huangshen, China (Berman et al. 2007; Matheson et al. 2006; McCarthy et al. 2009; Ruesto et al. 2010; Zhao 1991, 2005), and Singapore (Fuentes et al. 2008; Sha et al. 2009a,b) demonstrates that human gender, behavior, ethnicity, and familiarity with other primates affects the patterns and contents of interactions. Macaque sex, age, experience with humans, and species-specific characteristics also shape the structure and contents of the interactions. Additional factors such as the presence of food, topography of the interaction site, pattern/applications of local laws and customs regarding monkeys, local religions, and the presence and style of management at tourist sites all also structurally impact the interactions and their outcomes.

Other multisited ethnoprimatological projects include the investigation of bidirectional pathogen transmission in South and Southeast Asia and Gibraltar (Engel et al. 2006, 2008; Engel & Jones-Engel 2011; Jones-Engel et al. 2005a,b, 2008, 2011b) and the examination of human-alloprimate conflict over crops and space and the potential for sustainable human-alloprimate interfaces (Estrada 2006, Hill 2005, Hill & Webber 2010, Jones-Engel et al. 2011b, Lee 2010, Sprague & Iwasaki 2006). The results from the ongoing bidirectional pathogen studies show that cultural, economic, historical, and religious patterns interact with local ecologies, species differences across alloprimates, and pathogen landscapes to shape the risks and characteristics of pathogen exchanges. Viral pathogens such as the simian foamy virus and parasitic pathogens such as malaria seem to have a long history of complex coevolution between humans and alloprimates, and modern travel and tourism patterns may be rapidly changing the pathogen landscape and selection pressure for all species involved. The crop-raiding, conservation, and sustainable communities projects all point to increasing conflict for space and food as a critical component. Human economic and political realities influence habitat alterations and ecosystems such that alloprimates are increasingly forced into more intensive contact with humans. In most cases, management programs that incorporate anthropological orientations and multistakeholder approaches show the most potential, although in some cases it appears that the human social and economic crises will overwhelm attempts to find

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sustainable solutions that benefit alloprimates as well as humans.

CLIMATE CHANGE, ANTHROPOGENIC HABITATS, AND THE FUTURE OF HUMAN-ALLOPRIMATE COMMUNITIES

"...[A]nthropogenic climate change can alter interspecific interactions and produce unexpected changes in species distributions, community structure, and diversity" (Harley 2011). "Species interactions shape communities and ecosystem functions, but how will these interactions change as species evolve, migrate, or become extinct when the climate changes?" (Nogues-Bravo & Rahbeck 2011) Humans contribute to climate change via large-scale anthropogenic habitat alterations, massive hydrocarbon emissions, and other micro- and macroscale environmental impacts. This human-induced climate change occurs at local, regional, and global levels and affects a wide array of organisms in many ways, mostly negative, but some of which we may not yet be able to predict (e.g., Parmesan & Yohe 2003, Pounds & Puschendorf 2004). Work in marine contexts suggests that ongoing climatological shifts can have cascade effects across ecosystems at the levels of trophic relationships, physiological functioning, and system stability (Harley 2011). In regard to the human–other primate interface, evidence indicates that human hunting of primates may be a contributing factor to forest destruction and/or deleterious plant community alteration owing to primates' core roles as seed dispersers (Russo & Chapman 2011) and thus may be contributing to the global crisis in carbon recycling. We also know that human-created habitat alterations, including increased atmospheric pollution, impact primates and their ecosystems, particularly in tropical forest and coastal regions, and that this process is accelerating (Strier 2011). However, much of the immediate and long-term impact of climate change on nonhuman primates is poorly understood. When considered in the context of broadscale human-induced climate change, ethnoprimatological data sets highlight two primary areas of interest: (*a*) the role of niche construction in aspects of anthropogenic ecologies, and (*b*) the role of variation across locations and species as it relates to the practical potential for sustainable human-alloprimate communities.

Anthropogenic habitats emerge via human niche construction. Niche construction is the altering, building, and/or destroying of niches via the mutual interaction of organisms and their environments and is an important force in structuring evolutionary change, alongside natural selection (Odling-Smee et al. 2003). Whereas many organisms engage in some level of niche construction (e.g., earthworms and beavers), humans are niche constructors par excellence (Kendall et al. 2011). Humans engage in both intentional and by-product ecological change, which in turn affects the evolutionary pressures on the other species inhabiting human-occupied ecosystems (and adjacent ones). At the global level, humans are ecosystem engineers on the largest of scales, and these altered ecologies are inherited not only by subsequent generations of humans but by all the sympatric species residing within them. The ways in which humans and other organisms coexist (and/or conflict) within these anthropogenic ecologies shape the perceptions, interactions, histories, and futures of the inhabitants (e.g., Ingold 2000, Mullin 1999), which can be especially significant for human relationships with other primates (Fuentes 2002, Fuentes & Wolfe 2002). Thus niche construction, and its resultant climate and habitat changes, impacts alloprimates' lifeways and thus our perceptions of them and interactions with them.

The construction and expansion of urban spaces, the alteration of forest landscapes for agricultural or other uses, the creation of roads and other transportation systems, and the rapid increase in human population numbers, and our dietary needs, affect local and regional ecologies, changing aspects of their structure and function. Alloprimates can find themselves completely intertwined in such systems. The

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expansion of human residential areas into areas of overlap with other primates, especially high-density urbanizations, increases the type and intensity of interaction opportunities with alloprimates and simultaneously alters primate ranging, foraging, and behavior. Increased human building, road construction, forest clearance, and industrial output can affect local microclimates in both temperature and rainfall regimes, shifting patterns and types of plant growth and fruiting in addition to changing the structural landscape. Alloprimates must then adapt their behavior to human structures (houses, roadways, sewage systems, etc.) and the local climatic and phenological shifts, move away from the impacted area, or perish. Increasing human populations and the pace of residential expansion in areas where other primates live (specifically the global south) are making the move-away option less tenable; thus, there appears to be a pattern of ecological selection for those alloprimates that are best able to coexist with humans (e.g., macaque monkeys in South and Southeast Asia, baboons in sub-Saharan Africa) and selection against those who cannot (e.g., apes and leaf monkeys). Human niche construction and its concomitant climate change likely constitute the main selection pressures on other primates today (Fuentes & Wolfe 2002, Strier 2011), but there is no one-size-fits-all approach to understanding this suite of relationships. Given this scenario, what do the available ethnoprimatological data sets suggest for alloprimate and human communities moving forward?

The outlook for the great apes (gorillas and chimpanzees in Africa and orangutans in Southeast Asia) is extremely bleak. Increased interactions between humans and these ape species almost always have negative results for the apes. All three great apes require very large areas for their ranges and a diverse phenological profile including heavy fruit representation for their dietary needs, and their reproductive cycles are slow and easily disrupted. Additionally, the body size and behavioral profiles of the apes make it extremely unlikely that they can coreside with human populations, particularly agricultural ones (e.g., Hockings et al. 2010). Logging and other forms of forest alteration are extremely deleterious to these apes. One small beneficial ethnographic element is the presence of taboos on hunting chimpanzees and gorillas in some indigenous peoples who overlap with these apes in forested Central Africa. There are no such beliefs about orangutans in Southeast Asia. Both African apes are targeted by bushmeat hunters, and until very recently, orangutan females were frequently slaughtered to acquire infants, which were in extremely high demand in the Asian pet trade. However, increased enforcement of wildlife trade laws has reduced the pet market stressor for orangutans in recent years. Parts of the bodies of all ape species are highly prized by some human cultures for their assumed medicinal and virility benefits, and in central Africa their meat is economically valuable, thus providing financial incentives for their slaughter. Across Central Africa, intensive human migrations into previously low-human-density forested areas, bringing with it nutritional and disease stress, and political and economic instability continue to plague almost all areas where humans overlap with chimpanzees and gorillas. In Sumatra and Borneo, the last ranges of the orangutan, the economic impetus to convert forest land to timber, plantation, or other agricultural means, driven by local and global economics, is the primary cause of ape population decline.

Unlike the apes, some alloprimate monkey species appear much better able to coexist with humans, particularly the baboons and macaques. Physiologically, both of these primate groups are primarily generalist foragers and their digestive systems are relatively simple; they do quite well subsisting on human food and food waste. Across Africa, many baboon species continue to maintain large populations in and around human habitation, even as human populations expand (Sweddell 2011). In many areas of South Asia, Southeast Asia, and Japan, macaque monkeys (especially those of the *Macaca fascicularis mulatta* species group) appear to be maintaining large population sizes in and around human towns, cities, and

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other anthropogenic landscapes (Gumert et al. 2011). Tourism frequently plays an important role in affecting human-alloprimate community sustainability; tourist economies are becoming central components in the ecologies of both humans and the alloprimates, especially in South Africa (baboons) and Southeast Asia (macaques). Hindu, Buddhist, and Shinto religious traditions, temple landscapes, and popular mythos appear to help create a baseline for sustainable (but not conflict free) relationships between macaques and humans across much of the Asian landscape (Fuentes 2007, 2010; Riley et al. 2011). There is little evidence for a similar broadly distributed and deep-rooted affiliative relationship involving social and religious landscapes between baboons and humans in Africa, yet the baboon populations continue to do reasonably well around humans.

Given relatively few ethnoprimatological studies of alloprimate populations in South and Central America (Cormier 2006, Estrada 2006, Parathian & Maldonado 2010), we can predict little about alloprimate community sustainability from ethnoprimatological data sets. We do know that many Amazonian groups simultaneously hunt and maintain strong social and sustainable ecological relationships with different alloprimate species. However, as with other locales where humans and primates overlap, deleterious outcomes are tied to deforestation and landscape conversion, which are ongoing at extremely high rates in South America. In Amazonia, these threats seem to impact negatively both the indigenous people and the alloprimates sharing the forests with them, further suggesting the need for intensive ethnoprimatological analyses. With even fewer ethnoprimatological studies in Madagascar, we have no structural insight into such issues for lemurs as of yet.

I open this article by noting the humans are literal and figurative kin to other primates, and in many areas of the planet we coexist in diverse social, ecological, symbolic, conflictual, and even hopeful contexts. The practice of ethnoprimatology recognizes that these contexts are the core to understanding our relationships and to effective management of the future of the human-alloprimate interface. By adopting a synergistic tool kit taking generously from across anthropology and primate studies, we will be better prepared and more intellectually honest and, we hope, able to tackle effectively the complexities of the Anthropocene in ways beneficial to ourselves and our primate kin.

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